

FIG. 1

The diagram illustrates a motor control system for a synchronous motor. The system includes a power supply (1) connected to a diode rectifier (2) and an inverter (4) with an IM (induction motor) load. The inverter is driven by a gate circuit (6) and a gate signal generator (16). The gate signal generator receives U, V, W, X, Y, Z signals. The system also includes a dq/uw converter (15) and a uw/dq converter (11). The dq/uw converter receives a frequency command  $\omega_1^*$  and a torque boost voltage command  $\Delta V_t^*$ . It outputs  $V_u^*$ ,  $V_w^*$ , and  $V_w^*$  signals. The uw/dq converter receives a torque boost voltage command  $\Delta V_t^*$  and outputs u, v, w signals. The system also includes a limiter processing unit (13) and an excitation current limiter (12). The limiter processing unit receives a torque boost voltage command  $\Delta V_t^*$  and outputs a torque boost voltage compensation value  $\Delta V_c$ . The excitation current limiter receives an excitation current limitation level  $I_{dmax}^*$  and outputs an excitation current  $I_d$ . The system also includes a PI controller (12) and a limiter processing unit (13). The PI controller receives an excitation current limitation level  $I_{dmax}^*$  and outputs an excitation current  $I_d$ . The limiter processing unit receives a torque boost voltage command  $\Delta V_t^*$  and outputs a torque boost voltage compensation value  $\Delta V_c$ . The system also includes a V/F gain block (7) and a torque boost voltage command block (8). The V/F gain block receives a frequency command  $\omega_1^*$  and outputs a torque boost voltage command  $\Delta V_t^*$ . The torque boost voltage command block receives a torque boost voltage command  $\Delta V_t^*$  and outputs a torque boost voltage command  $\Delta V_t^*$ .

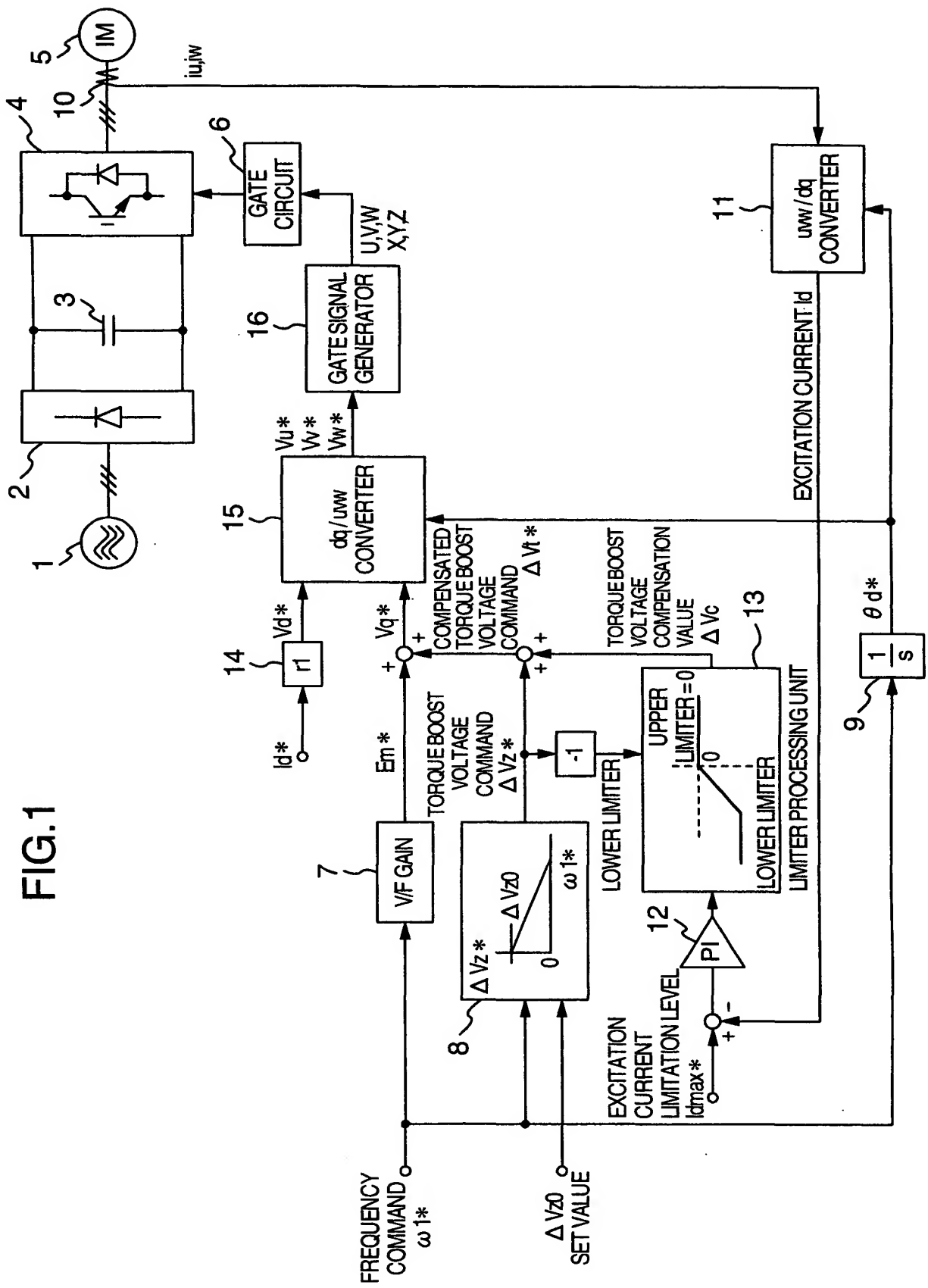


FIG.2

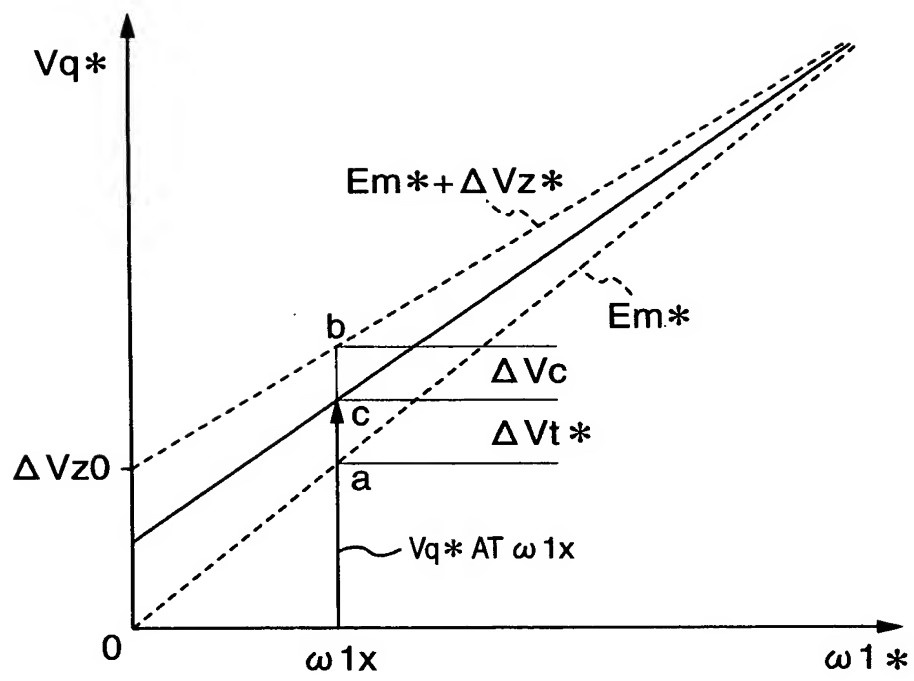
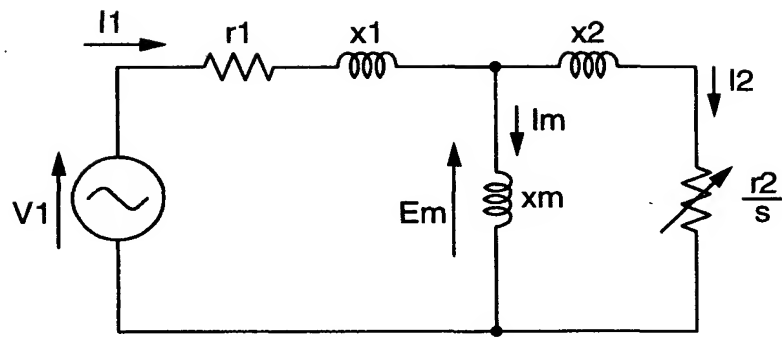
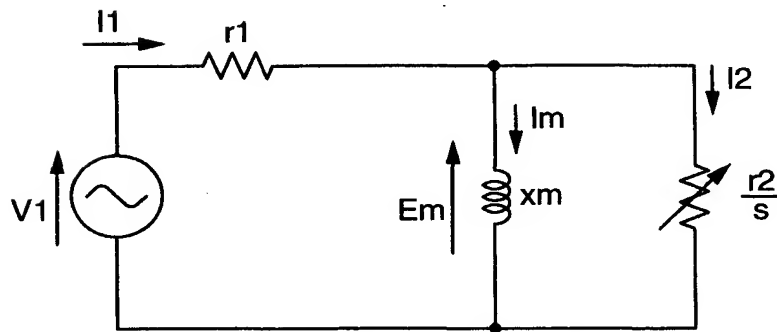


FIG.3A



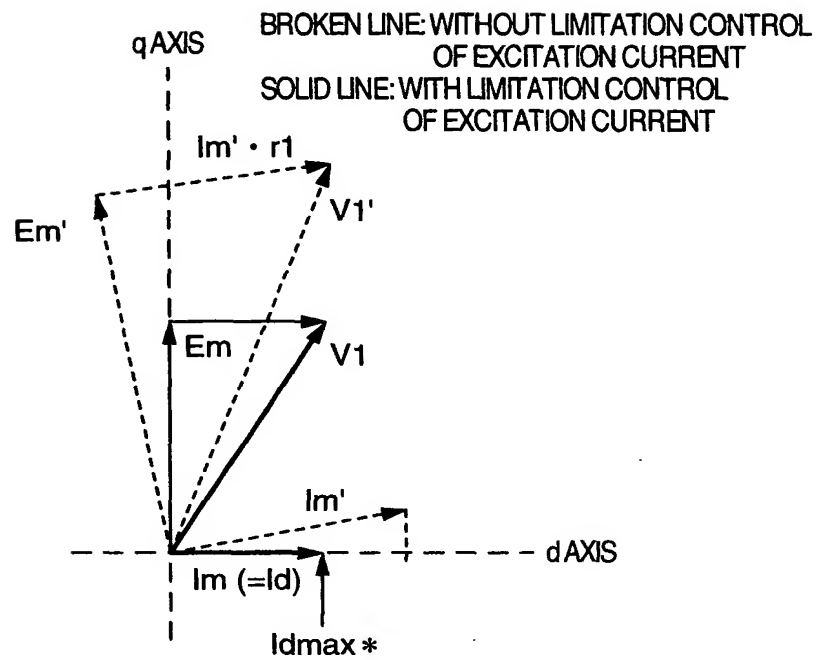
T-TYPE EQUIVALENT CIRCUIT OF INDUCTION MOTOR

FIG.3B



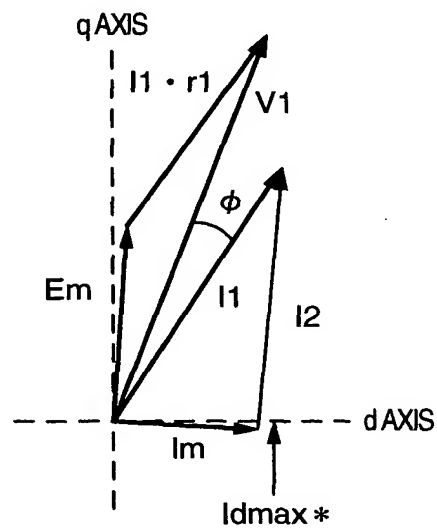
APPROXIMATE EQUIVALENT CIRCUIT AT LOW FREQUENCY

# FIG.4A



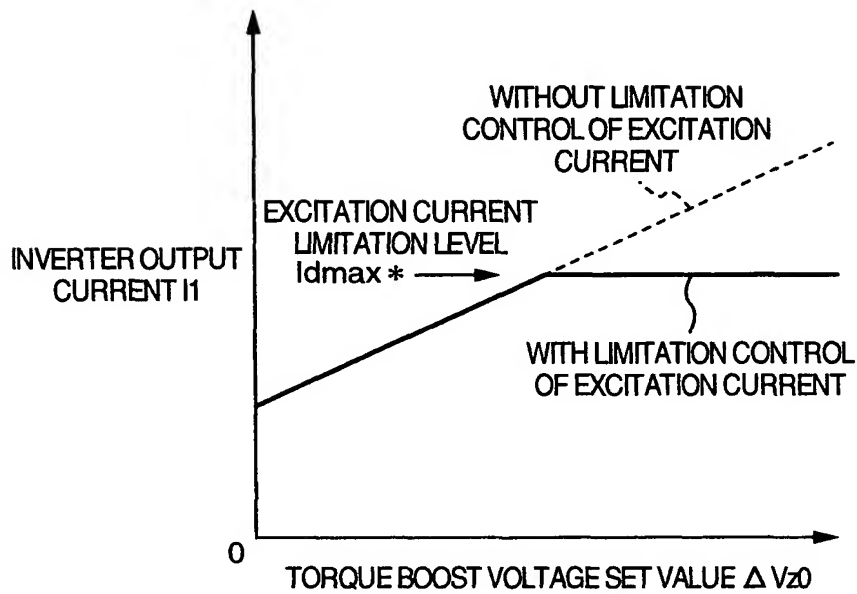
VOLTAGE AND CURRENT VECTOR DIAGRAM IN NO LOAD

# FIG.4B



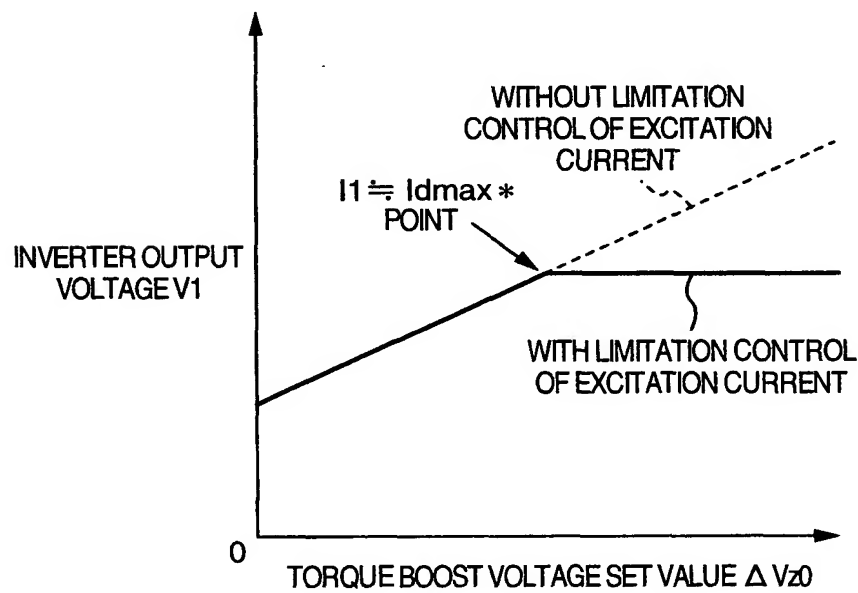
VOLTAGE AND CURRENT VECTOR DIAGRAM IN HEAVY LOAD

# FIG.5A



CHARACTERISTIC OF  $I_1$  IN CASE OF FIXED FREQUENCY COMMAND AND NO-LOAD OPERATION

# FIG.5B



CHARACTERISTIC  $V_1$  IN CASE OF FIXED FREQUENCY COMMAND AND NO-LOAD OPERATION

FIG.6

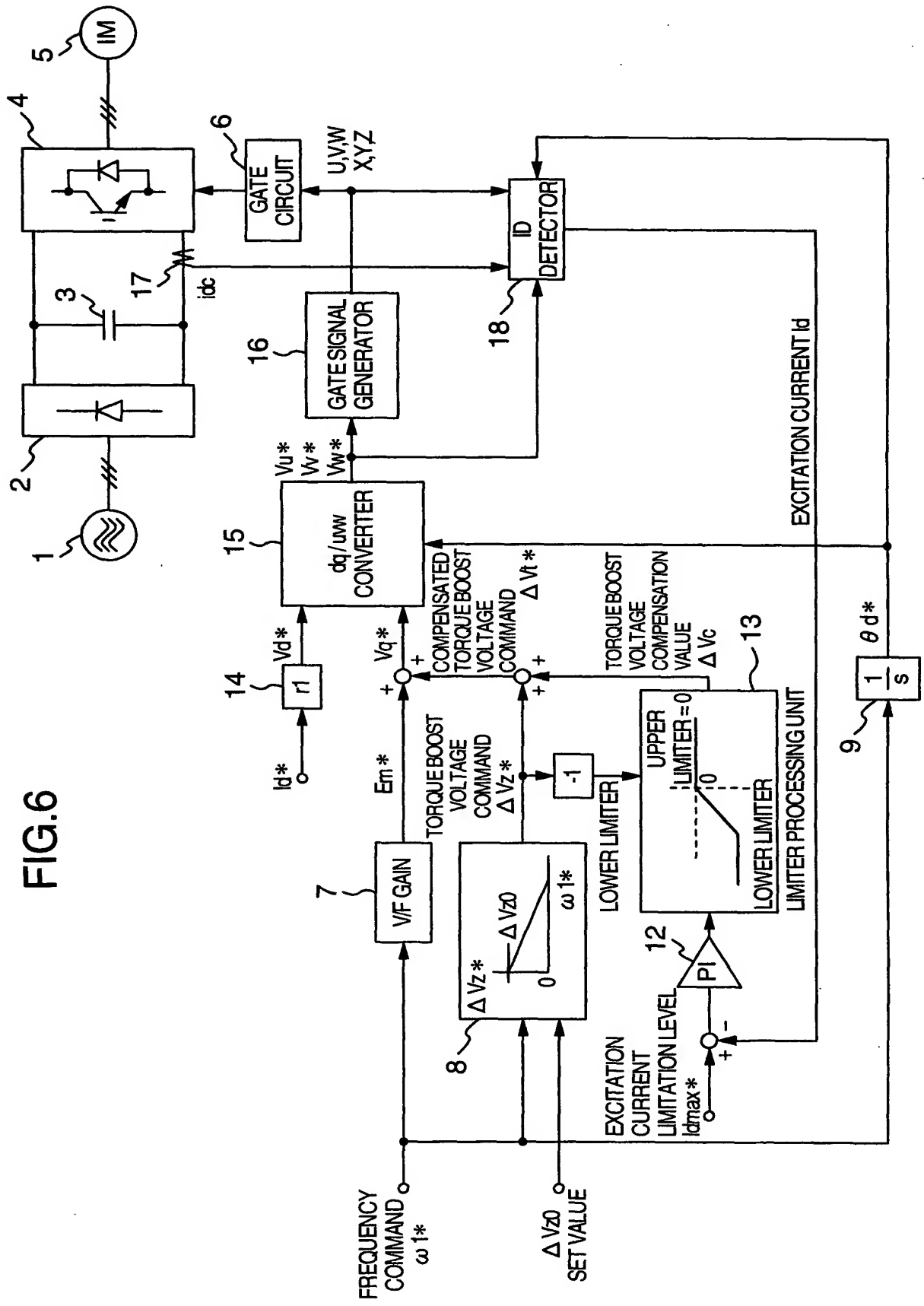


FIG.7

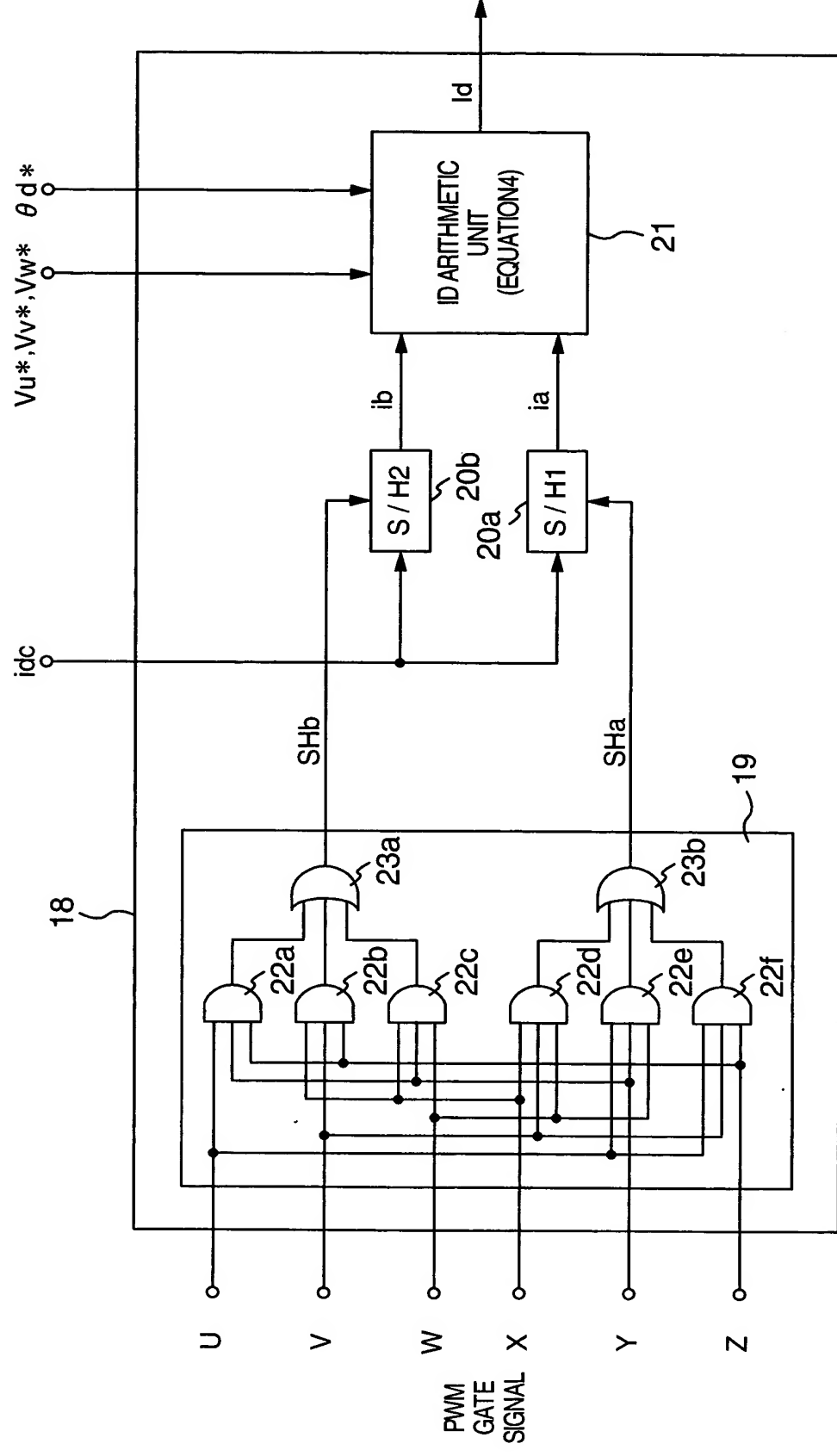


FIG.8

